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REMARKS

I. Status of the claims

Claims 1-4, 6-9, 11, and 13-17 are pending in this application. Claims 1 and 9 have been amended to remove the limitation relating to the nitrogen content. New claims 18 and 19 represent original claims 5 and 12, respectively.

II. Rejections under 35 U.S.C. § 103(a)

The examiner has rejected claims 1-4, 6-9, 11, and 13-17 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 1,886,480 to Haller et al. ("Haller") in view of the article entitled "Flame Retardant Cellulose" authored by Sello et al. ("Sello"). These claims have also been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,036,731 to Scheibli et al. ("Scheibli") in view of Sello.

The examiner states that Haller teaches the formation of cellulose derivatives treated with cyanuric halide and Scheibli, the other primary reference, teaches cellulose fibers having amino-s-triazine compounds treated under alkaline conditions. Sello, the secondary reference used in both rejections, teaches, according to the examiner, flame retardant cellulose compounds comprising triazine derivatives that have the same chemical backbone structures as Haller and Scheibli. The examiner then asserts that a skilled artisan would combine the teachings of Haller and Scheibli with the teachings of Sello to produce a cyanuric halide having flame retardant properties of the applicants' claimed invention.

The thrust of the examiner's argument as to why a skilled artisan would combine the teachings of the references lies in the "same chemical backbone structures" that link Haller, Scheibli, and Sello. Examining the cellulose structures disclosed in these references shows that Haller discloses cyanuric halides, Scheibli discloses 1,3,5-triazine radicals in which two of the substituents on the ring may be chlorine, and Sello discloses polymethylol derivatives containing phosphonate substituents. The same chemical backbone structure, which the applicants understand to be the common feature exhibited in each disclosed compound, appears to be a triazine ring ($C_3N_3H_3$). Since Haller and Scheibli do not disclose compounds having phosphorus-containing substituents, and Sello does not disclose compounds having chloride substituents, the only common feature appears to be the central triazine ring.

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Therefore, if one skilled in the art were to have combined the teachings of Haller or Scheibli with Sello based on the same chemical backbone structure, that skilled artisan would have combined these references based on the triazine ring featured in all the structures. As set forth below, the applicants disagree that the triazine ring would provide a skilled artisan with the requisite motivation to combine the references in this manner.

Hawley's Condensed Chemical Dictionary does not have a listing for "triazine," but does list the following triazine derivatives: ammelide, ammeline, melamine, 6-azauridine, and cyanuric acid. Ammelide is a crystalline solid similar to malamine and suggested for melamine-type (amino) resins; ammeline is a crystalline solid that is used in melamine-type resins and in special high-temperature lubricants; melamine is a white, monoclinic crystalline structure used in melamine resins (which are used for formation of water-base industrial and automotive finishes), organic syntheses, and leather tanning; 6-azauridine is derived from microbiological fermentation and used for research on cell formation and cancer; and cyanuric acid consists of white crystals used for chlorinated bleaches, selective herbicides, and whitening agents. Copies of the relevant dictionary definitions of these compounds are provided for the examiner's reference (see Appendix).

Reviewing just this short list of triazine derivatives, it is clear that triazine derivatives have various different uses in a wide range of commercial products. There are so many different substituents that may be added to the triazine ring that impart different features to the final compound that it is virtually impossible to predict the properties of any one triazine derivative based upon the triazine ring itself. It therefore cannot be asserted that a skilled artisan would be able to predict with any certainty the applicability of two compounds based solely on the common triazine ring.

This unpredictable nature of triazine derivatives did not go unnoticed by Sello. In conclusion 4.3 on page 399, Sello states, "Good flame retardancy can be obtained, but the synergistic effect of the nitrogen in the phosphonate substituted triazine compounds is less pronounced than predicted from other structures." Even dealing with a small subset of triazine derivatives, *i.e.*, those that contain phosphonate groups bonded to one of nitrogen atoms in the ring, the predictability with regard to the flame retardancy of triazine derivatives is quite low.

Unpredictability of the properties of similar compounds is a factor determinative in whether a skilled artisan would have been motivated to combine the references. See MPEP § 2144.08(e). If the technology is unpredictable, it is less likely that structurally similar species will render a claimed species obvious because it may not be reasonable to infer that they would share similar properties. *In re May*, 574 F.2d 1082 (CCPA 1978). See also MPEP § 2144.09. The presumption of obviousness based on a reference disclosing structurally similar compounds may be overcome where there is evidence showing there is no reasonable expectation of similar properties in structurally similar compounds. *Id.*

In this case, there is no predictability between the properties of two structures that only share a triazine ring. One skilled in the art would have neither the motivation to combine the references nor an expectation of successfully replicating the desired property when the only common feature of the compounds disclosed in the references is the triazine ring.

Sello is the only reference that teaches that triazine derivatives may be used as flame retardants. Haller and Scheibli do not discuss any flame retardancy with regard to the cellulose compounds. Haller uses the disclosed cellulose compounds for dyestuffs, and while Scheibli focuses on the crosslinking ability of the disclosed fibre compounds for permanent finished textiles. In fact, Scheibli teaches away from any suggestion that the disclosed compounds may have flame retardant properties by suggesting that flame retardants could be added to the compounds. See col. 13, lines 60-63.

Thus, while Sello is the only reference that suggests that derivatives of triazine rings may be useful as flame retardants, there is no predictability in properties between the triazine derivatives disclosed in Sello and the triazine derivatives disclosed in Haller and Scheibli. Therefore, in view of the unpredictability of the properties of the various triazine derivatives, one skilled in the art would not be motivated to combine the teachings of Haller and Scheibli with the teachings of Sello. If the teachings were combined, the skilled artisan would have no expectation that the compounds disclosed in Haller and Scheibli would exhibit flame retardant properties based on the teachings of Sello.

In sum, the compounds disclosed in Sello are similar to the compounds disclosed in Haller and Scheibli only in the triazine ring. In view of the unpredictability in the properties of different triazine derivatives, this similarity is not enough to provide a skilled artisan with

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the requisite motivation to combine the references and render the applicants' claimed invention obvious. Accordingly, the applicants respectfully request that the examiner withdraw these § 103(a) rejections.


III. Conclusion

The applicants believe that this amendment and response addresses all issues raised by the examiner in the outstanding official action. If any issues in the prosecution of this application remain unresolved, the examiner is encouraged to contact the undersigned counsel at the number listed below in order to resolve such issues.

Please charge any fees associated with the submission of this paper to Deposit Account No. 033975. The Director is also authorized to credit any overpayments to the above-referenced deposit account.

Respectfully submitted,

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